COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
SUBCOMMITTEE ON ENERGY
U.S. HOUSE OF REPRESENTATIVES
HEARING CHARTER

The Future of Electricity Delivery: Modernizing and Securing our Nation's Electricity Grid
Wednesday, July 17, 2019
2:00 PM EST
2318 Rayburn House Office Building, Washington, D.C. 20015

PURPOSE

The purpose of this hearing is to examine research needs to modernize and secure our nation's electricity grid. The hearing will focus on two draft bills. The first, the Grid Modernization Research and Development Act of 2019, sets out a research, development, and demonstration agenda on grid resilience and emergency response; smart grid modeling, visualization, architecture, and controls; grid-scale energy storage; hybrid energy systems; and integration of renewable energy sources, vehicles, and buildings onto the electric grid. The second, the Grid Cybersecurity Research and Development Act of 2019, authorizes a research, development, and demonstration program on cybersecurity research in the electricity sector; directs DOE to develop standards, protocols, and roadmaps on grid cybersecurity; authorizes a technical assistance program to help utilities identify and address cybersecurity concerns; establishes an education and workforce training program for cybersecurity professionals; and creates an interagency Task Force on Grid Cybersecurity.

WITNESSES

- **The Honorable Karen Evans,** Assistant Secretary, Office of Cybersecurity, Energy Security, and Emergency Response, U.S. Department of Energy
- **Mr. Juan J. Torres,** Associate Laboratory Director, Energy Systems Integration, National Renewable Energy Laboratory and Co-Chair, Grid Modernization Lab Consortium
- **Ms. Kelly Speakes-Backman**, CEO, Energy Storage Association
- **Ms. Katherine Hamilton**, Chair, 38 North Solutions and Executive Director, Advanced Energy Management Alliance

BACKGROUND

Our nation's electricity grid is undergoing a series of transformations, which includes adapting to a changing electricity generation mix[1]; an increase in "smart grid" technologies to help develop an intelligent electric power system[2]; and a growing need to improve the resilience of the electric power grid.[3] Additionally, the recent milestone of the very first report of a cybersecurity threat on the U.S. electricity grid on March 5, 2019 has elevated the importance of upgrading our nation's resilience to cybersecurity attacks on our electricity systems.[4] The Department of Energy has an important role to play in the development of technologies and other supporting programs to achieve these goals.

Prior to 2018, the Department of Energy research programs on grid modernization and grid cybersecurity were housed under a single office called the Office of Electricity and Energy Reliability. On February 14, 2018, Secretary Perry announced that this office would be split into two offices: the Office of Electricity (OE) and a new Office of Cybersecurity, Energy Security, and Emergency Response (CESER).[5] CESER was formed to "support the Administration's commitment to protecting energy infrastructure security" and this new organization structure was reflected in the President's FY19 budget request.[6] The sections below summarize the roles of these two offices.

Department of Energy, Office of Electricity (OE)

The DOE Office of Electricity's main mission is to support grid modernization and resilience through programs that improve the planning and operational capabilities of the electrical sector at both the transmission and distribution level. This includes research on a variety of technologies related to: the smart grid, demand response, microgrids, energy storage, renewable energy integration, transformer resilience, grid planning, sensor development, and power flow controllers. OE also provides technical assistance to States, regional entities, and tribes on a variety of topics to assist with the development and implementation of their electricity-related policies and handles permitting of cross-border transmission lines and coordinating Federal transmission permitting on Federal lands.

The President's Fiscal Year 2020 budget request would, if enacted, increase federal support for OE R&D activities by 17% from the FY19 enacted level. Most programs receive an increase in

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[1] https://www.eia.gov/todayinenergy/detail.php?id=38053#
[2] CRS, *The Smart Grid: Status and Outlook*, https://www.crs.gov/Reports/pdf/R45156
[3] National Academies of Science, Engineering, and Medicine, *Enhancing the Resilience of the Nation's Electricity System,* https://www.nap.edu/catalog/24836/enhancing-the-resilience-of-the-nations-electricity-system
[4] DOE Electric Emergency and Disturbance Report, https://www.oe.netl.doe.gov/download.aspx?type=OE417PDF&ID=79
[5] https://www.energy.gov/articles/secretary-energy-rick-perry-forms-new-office-cybersecurity-energy-security-and-emergency
[6] CRS, *DOE Office of Electricity Delivery and Energy Reliability: Organization and FY2019 Budget Request*, https://www.crs.gov/reports/pdf/IF10874

funding and the request also includes a 30% cut for research on resilient distribution systems (RDS).[7] The major decrease in funding for RDS research would result from cutting programs that support research on low cost distribution sensors and development of Internet of Things (IOT) devices for use on the electric grid. The FY20 budget also includes a proposal for a new "Advanced Energy Storage Initiative," described as an "intra-Departmental initiative" that "aligns shared R&D across the Offices of Fossil Energy, Electricity, and Energy Efficiency and Renewable Energy in energy storage".[3]

FY 2019 Enacted:	$ 156 million
FY 2020 Budget Request:	$ 182.5 million

Department of Energy, Office of Cybersecurity, Energy Security, and Emergency Response (CESER)

The DOE's Office of Cybersecurity, Energy Security, and Emergency Response (CESER) mission is to lead "the Department of Energy's emergency preparedness and coordinated response to disruptions to the energy sector, including physical and cyber-attacks, natural disasters, and man-made events".[8] CESER programs support improving cybersecurity preparedness in the energy sector; coordinating responses and recovery from cyber incidents; detecting and mitigating cyber risks for energy sector owners and operators; and sharing of threat information among energy sector partners, in addition to a variety of other activities. CESER partners with other federal agencies, including DHS, DOD, and NIST, and industry partners in carrying out its mission.

The President's Fiscal Year 2020 budget request would, if enacted, increase federal support for CESER R&D activities by 30.4% from the FY19 enacted level.

FY 2019 Enacted:	$ 120 million
FY 2020 Budget Request:	$ 156.5 million

LEGISLATION

Draft Grid Modernization Research and Development Act of 2019

This draft bill authorizes a broad research, development, and demonstration agenda on several topics relating to grid modernization. It would authorize existing activities at the DOE pertaining to grid resilience, emergency response, and modeling and visualization activities. It would also

[7] https://www.energy.gov/sites/prod/files/2019/04/f61/doe-fy2020-budget-volume-3-part-1_0.pdf
[8] https://www.energy.gov/ceser/ceser-mission

provide programmatic direction on emerging research areas including hybrid energy systems, which are systems composed of two or more energy sub-systems that provide services such as thermal energy storage, desalination, and chemical production. The draft bill also authorizes research on the integration of various technologies and systems onto the electric grid, including renewable energy, vehicles, and buildings. Lastly, this draft bill would authorize a cross-cutting research program on grid-scale energy storage, which incorporates language from the Promoting Grid Storage Act (H.R. 2909), introduced this Congress by Mr. Casten, Mr. Luján, Mr. Doyle, Mr. McNerney, Mr. Bacon, Mr. Tonko, Mr. Foster, and Mr. Welch, and the Better Energy Storage Technology (BEST) Act (H.R. 2986), introduced this Congress by Mr. Foster, Mr. Casten, Ms. Herrera Beutler, and Mr. Gonzalez.

Draft Grid Cybersecurity Research and Development Act of 2019

The current draft of the Grid Cybersecurity Research and Development Act of 2019 is an updated version of H.R. 4120 from the 115th Congress, which was introduced in 2017 by Mr. Bera, now-Chairwoman Johnson, Mr. Lipinski, Ms. Bonamici, and Ms. Rosen. This bill would authorize a cross-agency research and development program to advance cybersecurity capabilities for the electricity sector across the Department of Energy, Department of Homeland Security, National Institute of Standards and Technology, and National Science Foundation. This draft would include authorization of test bed facilities to test and improve cybersecurity devices, components, and processes; development of an Interagency Strategic Plan to advance cybersecurity capabilities for the electricity sector; and authorization of an education and workforce training program led by DOE to identify core skills used by industrial control system (ICS) cybersecurity professionals and to develop methods to retrain electricity sector personnel.